INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1991	**Park:** Shenandoah NP
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Additional investigators or key field assistants (first name, last name, office phone, office email):

No co-investigators

Permit#:
SHEN1991ABBB

Park-assigned Study Id. #:
unknown

Project Title:
The Effects of a Mid-July Wildfire on Forest Vegetation and Soils in the Shenandoah National Park, Virginia

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1989	**Study End Date** Jan 01, 1991

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Land Use / Forestry

Objectives:
To determine the effects of a mid-July variable intensity wildfire on (1) vegetation composition, structure, mortality, and regeneration; (2) successional patterns; and (3) forest floor and mineral soil physical and chemical properties within the pine forest type.

Findings and Status:
The project involved the study of wildfire effects on soil and vegetation in two forest types: mixed pine and mixed oak. In the pine forests heavily burned, lightly burned, and unburned areas were compared one and two years after the fire. As expected, the heavily burned areas had more significant impacts on both soil and vegetation. Most noteworthy were the entire consumption of the forest floor, with significant reductions in total carbon and nitrogen. Also, the heavily burned areas experienced 98% tree mortality, compared to 26% for the lightly burned areas. Initially, over- and understory plant species diversity decreased as a result of the fire, but diversity in the ground layer flora increased. The number of Table Mountain Pine seedlings in the heavily burned area was over 1700% greater than in the adjacent unburned forest.;We feel that wildfires tend to create necessary environmnetal conditions favorable for regeneration of these pine forests. Fires destroy or reduce the overstory, creating open conditions; cause serotinous cones to open and release stored seeds; and provide a favorable mineral soil seedbed. Also important is the deleterious effect on site quality and the removal of nitrogen and organic matter. Pines are able to compete well on these impoverished sites, but would have difficulty competing with invading oaks as the sites built up higher levels of nutrients and moisture.;The mixed oak forest did not receive a heavy burn, so lightly burned areas were compared with the unburned forest two years after the wildfire. Effects on the forest floor and surface mineral soil were minor. The fire killed a large number of small stems in the overstory (37%), but had little effect on overstory basal area (only a 5% reduction). Since nost of the overstory remained intact, there were no important effects on regeneration in the mixed oak forest.;Previous researchers have shown that these high elevation pine forests require fire or disturbance to regenerate naturally. We feel that fire's effect on site quality is another important reason why these forests are able to maintain themselves in a fairly pure composition.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**

3329	0
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
n/a	0